The ISO 191* Metadata Standards include standard content for an unprecedented range of documentation needs. This breadth can be daunting for those trying to learn the Standards and use them effectively. This problem is exacerbated by a traditional approach to describing the Standards that is rooted in the concept of a complete ?record? as the fundamental metadata object. This approach starts at the ?top? of the Standards where complexity is maximized and, therefore, difficult to get a handle on. It is not surprising that it seems overwhelming.

The approach used in this series takes a fundamentally different point of view from the ?bottom? of the Standards. The ISO Standards are made up of a collection of objects that are held together to make larger structures, much like atoms are held together to form molecules. We start with simple atoms and, as understanding of the fundamentals is gained, we build them step by step into molecules. The first collection of atoms is described in the ISO Connections Category.

A variety of skills and points of view are important for creating good documentation. Creating Good Documentation provides an overview of a team approach that may be helpful. It also outlines the spiral approach that involves building understanding by learning in small pieces that are related to specific capabilities. Finally, the ISO FAQ page provides answers to some specific questions.

Contents

Transition From FGDC

The FGDC and ISO Standards include many of the same documentation concepts and, therefore, share much of the same content. The ISO Standards include much more flexible and detailed descriptions of much of that content. In addition, there are significant differences between FGDC and ISO that are related to technical improvements during the period between the development of the two standards.

First, the ISO Standards are described using a standard graphical language for describing objects, their characteristics, and relationships between them (Unified Modeling Language, UML). This language is a fundamental descriptive tool that is used for modeling all kinds of systems and for all ISO and Open Geospatial Consortium Standards. There are many reference materials and examples available for UML.

Second, the standard implementation of the ISO Standards is done using much more sophisticated XML techniques than were available when XML was originally applied to the FGDC Standard. These include schemas for more precise definitions of metadata elements and real-time validation of metadata documents,

schematron rules for checking XML documents against more sophisticated business rules, universal identifiers and xlinks for referencing and reusing content using restful web services.

These differences suggest that a fundamentally different approach is required for learning about the ISO Standards. This approach emphasizes learning first about UML and XML tools and then about applying those tools and using the standards. This foundation will make it possible for students to confidently explore the standard as they apply it to their data rather than follow some single strict path towards creating meaningful documentation.

Tools vs. Structures

A variety of tools exist for creating and managing ISO Metadata. They are developed by and aimed at a wide variety of audiences. There are web-based and desktop tools and some that work in multiple environments. Maintaining an up-to-date list of these tools and understanding or comparing their capabilities is likely a full-time job. We focus here on understanding the objects that make up the ISO Standards and the XML representations of those objects. A full-featured XML editor should be the only tool you need to gain this understanding and it should serve you well regardless of the tools you develop or use to create or manage metadata. Two full-featured editors that we are familiar with are Oxygen and XMLSpy. Both work very well.

Organizing Tools and Files
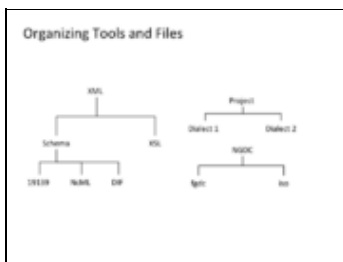
Organizing Tools and Files
Getting the tools and files organized in a way that makes it easy to work effectively can be a challenge. The Figure to the right shows an organization that has worked well for some of us that work with many metadata files and dialects. The XML directory holds various schema in sub-directories and a single directory holds all of the xslt files (it could have sub-directories to help organize xslts at some point). Each project generally has metadata records in multiple dialects, each of which has a subdirectory. This organization facilitates batch validation and translation processes.

Resources

It is impossible to anticipate all of the current and future resources that might be helpful as our understanding of how to use the ISO standards increases or to anticipate where those resources might come from. Rather than attempting this impossible task, we use this wiki as the collection point for these resources and reference appropriate pages in the wiki whenever possible. The ISO 19115 Category includes over 200 pages describing various aspects of the ISO Metadata Standards. As you use the standards, please use the wiki as a place to share your experiences, examples, and questions.

ISO Building Blocks Contents
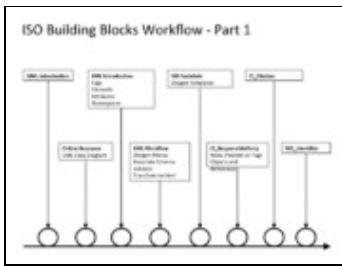
ISO Building Blocks Flow

The process of learning to use the ISO Standards effectively can be big and overwhelming. In software development big tasks are broken into a set of spirals each of which addresses important requirements in "bite-size" pieces. It is useful to break the process of creating and improving ISO metadata into spirals and we take the same approach with the learning process. The Figure to the right shows the first set of spirals for the ISO Building Blocks. The Spirals are also Categories in this wiki where related pages can be found. The initial spirals integrate UML, XML, and the ISO Connections.

Spiral One: Quick UML Introduction

The Unified Modelling Language is a general-purpose graphical modeling language for representing structures and activities related to software systems. It includes more than ten kinds of diagrams that serve various purposes in software design and construction. The ISO Standards generally use only one type of diagram, the *Class Diagram* which shows properties of classes and relationships between them. Understanding how to read these diagrams is an important step towards using the standards effectively. All you need to know is described on the Unified Modeling Language page.

Spiral Two: ISO Connections

High-quality metadata does not exist in a vacuum. It includes connections to other resources, either web pages or services, people, or other metadata records, or published materials. The ISO Building Blocks start with objects that make these connections to:

- Online Resources
- People
- Published Materials

These pages have some UML and examples of XML. Take a look at XML Basics if you are uncertain about XML.

Spiral Three: Basic XML Tools

There are several very capable tools available these days for working with XML files. These tools provide complete XML management environments that include many capabilities. Three of these capabilities are really critical to being able to use these tools to create and edit XML:

- Associating an XML schema with an XML file
- Validating the content of the file using the schema
- Transforming the XML to make it easier to read

Some pages in this wiki describe how to accomplish these tasks using the Oxygen XML Editor. Users that are familiar with other editors need to add similar content for those.

Spiral Four: Objects and References

Understanding objects and references is an important key to making sense of ISO metadata. It relies on XML attributes to identify and refer to objects.

Spiral Five: ISO Identifiers

ISO identifiers are used to include identifiers from external sources in the metadata. Do not confuse them with the XML identifiers described in the last spiral.

Pulling Things Together
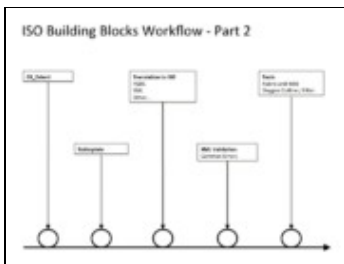
ISO Building Blocks Flow

Part One introduced many of the important pieces of ISO metadata with an emphasis on connecting the metadata to people and other types of resources and on several approaches to identifying things. In the second part of the course we start bringing these items together to form metadata records. The we start translating metadata from other dialects into ISO, identifying common validation errors, and introducing some tools for improving metadata records.

Spiral Six: Extents

ISO extents provide one of the most significant improvements over other metadata dialects. The EX_Extent object combines 3D spatial and temporal extents into a single object that can be used to attach extent information to a number of metadata objects.